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Poisonous Fishes

Because of their somewhat sporadic and unpredictable appearance, generally affecting only small numbers of persons at any one time, poisonous fishes have not attracted a great deal of attention in medical circles. However, the public health significance of poisonous fishes was pointed up in the series of outbreaks which occurred in Midway, Johnston, and the Line Islands beginning about 1943 and reaching a peak about 1946.

Recent mass intoxications in the western Pacific have once again directed attention to the public health importance of poisonous marine organisms. These outbreaks began about 1952, became increasingly severe during 1955, and have continued until the present time, intoxicating a number estimated at more than 40,000 persons. The bulk of the outbreaks have taken place in Japan, the Philippine Islands, and more recently, in Viet Nam. The causative agents were octopus, *Octopus vulgaris*, *O. dofleini*, squid, *Onna-strephes sloani pacificus*, Japanese horse mackerel, *Trachurus japonicus*, common Japanese mackerel, *Scombar japonicus*, flying fish, *Prognichthys ago*, and oceanic bonito, *Katsuwonus pelamis*. All of the outbreaks have been seasonal, taking place during June to the middle of September. Bacteriological tests have been negative and the degree of freshness of the organisms seems to have no bearing on the matter. The symptoms are similar to those produced by bacterial food poisoning, but no human pathogens have been isolated by Japanese epidemiologists. The mortality rate in the largest series of Japanese fish outbreaks in 1955 was 0.77%.

According to a report received from the Bureau of Fisheries of the Philippine Government, another series of outbreaks of fish poisoning took place in April 1957. The complete number of persons involved has not been determined, but several deaths have been reported. The causative agent in most of the Philippine poisonings has been the oceanic bonito, *K. pelamis*. Philippine public health authorities are establishing regulations prohibiting the sale of the oceanic bonito in some localities. Some intoxications from fishes have been reported in Viet Nam, but as yet no details are available as to the nature of the outbreaks.

Because intoxications resulting from poisonous fishes are frequently confused with a variety of other ailments, a review of the epidemiological and clinical aspects of the problem of ichthyosarcotoxism is timely.

Judging from the public health and toxicological reports that have appeared to date, any marine fish can under certain circumstances become poisonous as a result of its food habits. Toxicity is not species specific, except possibly in puffers or tetraodontoid fishes. More than 300 species of marine fishes have been incriminated as causative agents in producing human intoxications of the ciguatera type alone. Most poisonous fishes are shore forms rather than oceanic inhabitants. Fishes captured in deep waters far from shore are generally safe to eat. Some of the more common families

of marine fishes which have caused human intoxications are listed under the various clinical types of fish poisoning.

Poisonous fishes are largely circumtropical in distribution, but on occasion, occur in temperate waters. With the exception of 2 or 3 boreal species, they are currently believed to have a maximum distributional range of 45° north and 45° south of the Equator. Particularly large populations of poisonous fishes are known to occur in the central Indo-Pacific area and in the West Indies. They are more common near islands than along continental shores. Within these general areas, poisonous fishes seem to be quite circumscribed in distribution. They may vary considerably in their distribution about a single island. A species may be toxic in one part of the island, but edible in another. Lagoon fishes are more likely to be poisonous than those living on seaward reefs.

The toxicity of puffers or tetraodontoid fishes generally follows closely their reproductive cycle. The toxin content of the fish is greatest just prior to spawning. For most puffers, spawning takes place during late spring or early summer. Toxin content is lowest during fall and winter. There is some evidence that the barracuda (*Sphyraena* spp.) may follow a similar, but less pronounced, seasonal pattern. However, in most other species there is no evidence of a seasonal fluctuation.

The poison in tetraodontoid fishes is usually more concentrated in the liver, gonads, and skin, but other parts of the viscera may also be toxic. Puffer musculature is generally nonpoisonous. The distribution of poison is exceedingly variable in other kinds of fishes. If a fish is toxic, the musculature will be found to be poisonous in about 50% of the specimens, and the viscera, in about 90% or more. However, the distribution of the poison in the body of the fish varies from one individual to the next.

No consistent pattern has been observed as to the relationship between the size of the fish and its toxicity. It has been observed that unusually large specimens of jacks (*Caranx* spp.), grouper (*Epinephelus* spp.) and barracuda (*Sphyraena* spp.) are more likely to be toxic than smaller specimens. This has not been found to be necessarily true in other species.

To the best of present knowledge, one cannot detect a poisonous fish by its appearance. The most reliable field method is to feed a small sample of the fish to a kitten or a dog. If the animal remains asymptomatic for 12 hours, the fish is generally safe to eat. Investigations are currently in progress at the School of Tropical and Preventive Medicine, Loma Linda, Calif., with the hope of developing a reliable rapid chemical field test.

Because the chemical characteristics of fish poisons have not been defined, poisonous fishes may be tentatively classified on the basis of their phylogenetic relationships and symptomatology of the intoxications which they produce. Certain fish groups are classified under more than one category. Although the weaknesses of this somewhat artificial system are recognized, it appears to be the most practical classification at present. Forms of

ichthyosarcotoxism caused by fishes may be subdivided into clinical categories. (See Table)

Diagnostic characteristics of the various types of ichthyosarcotoxism

Type of poisoning	Causative fish	Symptomatology
Lamprey or hagfish-----	Lampreys, hagfish (slime, flesh).	Gastrointestinal upset(?). Precise symptomatology unknown.
Elasmobranch-----	Sharks, rays (liver, flesh)-----	Gastrointestinal symptoms predominate in mild cases; neurological symptoms in severe cases. Deaths reported, but case fatality rate unknown.
Chimaeroid-----	Chimaeroid or ratfish (flesh, viscera).	Neurological symptoms(?). Precise symptomatology unknown.
Gymnothorax or moray eel.	Moray eels (flesh, viscera)-----	Violent neurotoxic symptoms with convulsions and paralysis predominating. Case fatality rate about 10 percent or more.
Scombroid-----	Scombroid fishes—tuna, bonito, skipjack, etc. (inadequately preserved flesh).	Histamine-like reaction with nausea, vomiting, flushing of the face, swelling of the lips, urticaria, and pruritus. Symptoms subside usually within 12 hours. Antihistaminic drugs effective.
Puffer-----	Tetraodontoid or puffer-like fishes (viscera).	Rapid onset and extremely violent neurotoxic symptoms: paresthesias, motor paralysis, convulsions, death by respiratory paralysis. Case fatality rate about 61 percent.
Ciguatera-----	More than 300 species of tropical reef fish, including snapper, seabass, grouper, barracuda, wrasse, parrotfish, and surgeonfish.	Onset may be gradual or sudden. Symptoms mild to severe. Gastrointestinal and neurotoxic. Paresthesias, extreme weakness, joint aches, myalgia and paradoxical sensory disturbance predominate. Case fatality rate about 7 percent.
Gempylid diarrhea-----	Gempylids, escolar (flesh)-----	Diarrhea develops rapidly but is painless. No other untoward effects.

The treatment of fish poisoning is largely symptomatic. There are no specific antidotes and an attack does not impart immunity. Gastric lavage and catharsis should be instituted at the earliest possible time. In many instances, 10% calcium gluconate given intravenously has given prompt relief, whereas, in others it has been ineffective. Paraldehyde and ether inhalations have been reported to be useful in controlling the convulsions. Nikethamide or one of the other respiratory stimulants is advisable in cases of respiratory depression. In cases where excessive mucus production is a factor, aspiration and constant turning are essential. Atropine has been found to make the mucus more viscid and difficult to aspirate and is not recommended. Oxygen by inhalation and intravenous administration of fluids supplemented with vitamins given parenterally are usually beneficial. If laryngeal spasm is present, intubation and tracheotomy may be necessary. In cases of severe pain, opiates, such as morphine given in small divided doses, will probably be required. Cool showers

have been found to be effective in relieving severe itching. Patients suffering from the paradoxical sensory disturbance should be given fluids slightly warm or at room temperature, as well as vitamin B complex supplements. Antihistaminic drugs will be found to be useful in the treatment of scombroid poisoning.

Fish poisoning is a disease of antiquity. Fishes are believed to become poisonous as a result of their food habits—feeding on marine algae. There is no evidence that plankton or radioactive substances are a factor in the production of the poisons. Poisonous fishes are largely circumtropical in their distribution. Toxin content is greatest in puffers during their reproductive season of the year, but this is probably not true of most other fishes. The distribution of the toxin within the body of the fish is subject to considerable fluctuation, but if the fish is poisonous, some of the poison will be present in the viscera in about 90% of the cases. Poisonous fishes cannot be detected by their appearance.

Fish poisoning should not be confused with bacterial food poisoning with which it has no etiological connections. The over all incidence of fish poisoning is not known. There are eight clinical types of ichthyosarcotoxism recognized at present. With the exceptions of gempylid diarrhea and scombroid poisoning, all other types of ichthyosarcotoxism are characterized by neurotoxic symptoms. The treatment of fish poisoning is symptomatic. Little is known about the chemical and pharmacological properties of fish poisons. (Halstead, B. W., LCDR MC USNR, Poisonous Fishes: Pub. Health Rep., 73: 303-311, April 1958)

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Miliary Tuberculosis

In the course of observing patients admitted to the medical wards of the Cincinnati General Hospital, certain features of miliary tuberculosis have become apparent. In general, these features are inadequately described in the literature. Consequently, it has become clear that a new perspective is advisable in considering the patient with miliary tuberculosis and that the characteristics of the disease should be reexamined, particularly as they pertain to diagnosis.

The present report consists of an analysis of the clinical and laboratory findings and the results of therapy in a series of 68 patients with miliary tuberculosis consecutively admitted to the hospital.

The term miliary tuberculosis denotes massive invasion of the bloodstream by tubercle bacilli so as to produce small tubercles in large numbers in certain organs and miliary lesions in the lung. A distinction is made between the acute and more chronic forms of this type of tuberculosis. In the latter form, the process continues over a longer period of

time, allowing more extensive necrosis, confluence, and fibrosis to occur. The term "miliary" is preferred in this context to "hematogenous" or to "disseminated" because the latter terms are frequently used to designate localized blood-borne tuberculous disease, such as renal tuberculosis or lymphatic tuberculosis, whereas "miliary" has the desired connotation of widespread dissemination. In the present report, the term "miliary disease" indicates any disease roentgenographically simulating miliary tuberculosis.

The onset of symptoms of miliary tuberculosis was characteristically insidious and the duration of the illness prior to admission was frequently obscure. The stated length of illness was in the range of 3 to 15 weeks in most cases; a few were fulminating while in others the disease had apparently been producing symptoms for more than 3 months. The symptoms most commonly elicited were cough, weight loss, weakness, anorexia, and night sweats. As a group, these symptoms could obviously be caused by any of a large group of diseases. Additional symptoms which were more commonly related to the presence of meningitis included headache and delirium. The course of symptoms in those with meningitis suggested that miliary tuberculosis preceded meningeal involvement by a considerable period of time. The symptoms common to those with and without meningitis were present over most of the period of the illness; when headache and delirium supervened, it was usually just before admission to the hospital.

Of the 6 patients who complained of abdominal pain, 3 had peritonitis or retroperitoneal adenitis in addition to the miliary tuberculosis.

The differential diagnosis of miliary disease has been made more difficult by the demonstration that many different agents are capable of causing the appearance of miliary lesions in the chest roentgenogram. Felson has enumerated forty causes of acute miliary disease of the lung, recognizing that only sixteen are not exceedingly rare conditions. Frequently, more chronic causes must also be considered because an unrelated acute febrile illness may be superimposed on chronic miliary disease, such as silicosis. In spite of these considerations, at the Cincinnati General Hospital most patients presenting with miliary disease have been proved to have miliary tuberculosis. Other diseases considered most frequently in the differential diagnosis have been sarcoidosis and silicosis.

The desirability of bacteriologic or histologic proof of the tuberculous etiology of cases of miliary disease is obvious. In this age of specific chemotherapy, one can no longer wait for the diagnosis to become apparent as the disease progresses untreated. Nor is it advisable to initiate specific anti-tuberculous therapy unless steps have first been taken to produce bacteriologic or histologic confirmation. Once started, there rarely is any alternative but to extend therapy for at least a year's time. The physical and economic distress thus experienced by the patient may be of great importance to him as well as the social stigma and the possible threat that he has latent tuberculosis which will remain with him for the rest of his life.

In order to isolate M. tuberculosis, cultures and microscopic examinations were made of samples of sputum, gastric washings, urine, cerebrospinal fluid, bone marrow aspirates, and serosal exudates.

From a study of 68 adult patients with miliary tuberculosis, the following conclusions are reached:

Miliary tuberculosis is a disease most likely encountered in the general hospital or in the practice of any physician. The illness frequently lends itself to therapy in hospitals other than tuberculosis sanatoriums, and later in the home. Thus, it is of increasing interest to the internist and the general practitioner.

An increased proportion of the cases occur in the aged and in Negroes. It is commonly not associated with detectable tuberculosis elsewhere in the patient.

The diagnosis seldom is suggested by routine examination; it is strongly suggested by the roentgenographic demonstration of miliary nodulation. The main differential possibilities in the adult are tuberculosis, sarcoidosis, and silicosis. Further diagnostic aids are culture of pulmonary secretions and urine and biopsy of suggestive disseminated lesions. Proof may be achieved bacteriologically or by the demonstration of gross caseation. Liver biopsy may be of value in confirming the granulomatous nature of this disease. It is seldom diagnostic per se.

Therapy should be directed toward the miliary process and to the underlying caseous process from which it originated. This process commonly is not apparent clinically. Therapy is successful according to the extent of the disease. Most of those not surviving will die within the first month. Relapse in this series did not occur during chemotherapy. Relapse one to six years after the start of therapy has occurred in only one adequately treated patient.

A relatively poor prognosis is indicated in those patients who also have fibrocaceous pulmonary tuberculosis and is suggested in those failing to show tuberculin hypersensitivity.

(Biehl, J. P., Miliary Tuberculosis - A Review of Sixty-Eight Adult Patients Admitted to a Municipal General Hospital: Am. Rev. Tuberc., 77: 605-621, April 1958)

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Change of Address

Please forward requests for change of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda 14, Md., giving full name, rank, corps, and old and new addresses.

Hepatic Coma

Severe disease of the liver from any cause may lead to disorders of the function of the brain with both psychiatric and neurologic manifestations. These may range from subtle disturbances in behavior, through stupor with abnormal motor and reflex findings, to profound coma. The earlier, less severe findings are called "impending coma" or "precoma." Hepatic precoma and hepatic coma are embraced in "portal-systemic encephalopathy," a term which reflects the most popular modern theory of pathogenesis. In essence, this represents a revival and extension of the "intestinal intoxication" theory of mental dysfunction which was popular 20 years ago.

The encephalopathy of liver disease varies in its manifestations from a chronic relapsing neuropsychiatric disorder to acute, fulminating, frequently fatal coma.

Psychiatric aspects. Hypersomnia and inversion of the sleep rhythm are common, as are lethargy, apathy, slowness, and brevity of response. Episodes of wandering with attendant amnesia may start and stop abruptly. Phases of depression or euphoria may occur, some patients showing each of these at different times. Loss of memory for recent events, perseveration of speech, and disorientation in place and time are frequently seen. Hallucinations may be visual, auditory, tactile, or olfactory, in this order of frequency. Paranoid and hypomaniacal reactions occur. As the depth of coma increases, the psychiatric features fade.

Disorder of the motor system. "Flapping tremor" is the most characteristic disorder. It is best elicited by having the patient hold his arms and hands outstretched with the fingers spread apart. At irregular intervals of a fraction of a second to several seconds, the tremor occurs consisting of lateral deviation of the fingers, flexion-extension of the fingers at the metacarpal-phalangeal joint, and flexion-extension of the wrist. The movements are rapid, arrhythmic, and usually bilaterally asynchronous.

Deep tendon reflexes are exaggerated, increasingly so with progression up to the point of deep coma when flaccidity and areflexia supervene.

Rigidity of the extremities persisting during passive extension and flexion is common. It may be "clasp-knife" or "cog-wheel" in character and is most prominent in the lower extremities. Bilateral inequality of muscle tone and reflexes is usually present. Sustained ankle clonus occurs in the majority of patients, but varies from time to time. The plantar reflexes regularly become extensor when deep stupor or coma is present, but may occasionally do so in earlier stages.

Electroencephalogram. Paroxysms of bilaterally synchronous, symmetric high voltage, slow waves in the delta range of one and one-half to three per second occur at some time in the course of coma in the majority of patients. In the early stages, these "slow rollers" often occur in bursts and appear first in the frontal regions.

Fetor hepaticus. This characteristic sweet amine odor of the breath, frequently encountered in noncomatose patients with hepatic disease, is present in almost all patients in coma.

Often no precipitating factor can be recognized. Severe infection is a common inciting condition, especially pneumonia. Upper gastrointestinal bleeding is an important precipitating factor. It has recently come to be recognized that, although esophageal varices are the commonest source of upper gastrointestinal hemorrhage in patients with liver disease, the incidence of bleeding from other causes, such as peptic ulcer, is considerable. Abdominal paracentesis for relief of ascites has sometimes led to coma. Patients with liver disease may go into coma after any form of surgery, even of a minor type.

Treatment is directed toward elimination of precipitating factors, provision of general supportive care, and correction of the specific biochemical lesion.

The mortality rate for deep hepatic coma is very high, averaging about 90% for various reported series. The application of the principles of treatment outlined above offer promise of improving this bleak outlook. Sherlock and co-workers have recently reported that 11 of 34 patients in deep coma recovered and left the hospital after being treated by a regime based on withdrawal of dietary protein and administration of broad spectrum antibiotics.

For deep coma, the prognosis is poorer when the underlying disease is acute hepatitis than when it is cirrhosis. Female patients with cirrhosis appear to withstand deep coma better than men. In patients with cirrhosis, ascites, jaundice, and markedly depressed serum albumin levels are bad prognostic signs.

Recovery or death usually occurs after a few days of deep coma. However, there are cases on record of deep coma persisting for one or two weeks and there have been occasional recoveries among these.

During the past few years, research on hepatic coma has been active at both the clinical and laboratory level. New knowledge has been gained about pathogenesis, the varieties of clinical manifestations, and the nature of some precipitating factors. Programs of treatment based upon this new knowledge hold promise. (Grossman, M. I., Hepatic Coma: Gastroenterology, 34: 667-672, April 1958)

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Nephrotic Syndrome in Adults

The nephrotic syndrome is a disorder with only one constant clinical manifestation, namely edema. It is diagnosed, however, in the laboratory by evidence of massive proteinuria, a low concentration of plasma albumin, and a high concentration of serum cholesterol. It may or may not be accompanied by high blood pressure and by evidence of reduced kidney function. The urinary sediment is characterized by oval fat bodies and fatty droplets, but also may contain red blood cells. The nephrotic syndrome may occur in the course of chronic glomerulonephritis, long-standing diabetes, amyloidosis, disseminated lupus erythematosus, secondary syphilis, or bilateral thrombosis of the renal veins. It also may occur after the administration of certain drugs (Tridione, gold salts), or following bee stings or exposure to poison oak. Often, no cause or associated condition can be found.

Because the nephrotic syndrome is most common in children below the age of 5 years, there is little statistical data available on its incidence, natural course, or response to therapy in adults. By no means, however, is it a rare disorder. On the medical service of the Veterans Administration Hospital in Los Angeles, an average of approximately 18 new cases per year have been seen for the past 5 years.

In the past, it has been assumed that almost all instances of unexplained nephrotic syndrome seen in adults could be attributed to undiagnosed chronic glomerulonephritis. Preliminary renal biopsy studies, however, have shown that this may not be the case. It would appear instead that probably not more than one-half of adults with the nephrotic syndrome have chronic glomerulonephritis; the majority of the remainder have diabetes, disseminated lupus erythematosus, or amyloidosis, with rarer causes of the disorder accounting for a small percentage.

The natural course of the nephrotic syndrome in adults is unpredictable and varies with its cause. The majority of patients eventually die of renal failure. Although the outcome in children is more favorable than in adults, recent data suggest that there is no abrupt change in the mortality rate from childhood to adulthood, which supports the view that the nephrotic syndrome may represent the same disease in children and in adults. In an untreated patient, edema of variable severity may wax and wane, and may be constant or intermittent. Intervals of from a few weeks to as long as 5 years of complete clinical remission without proteinuria may be followed by recurrence. The edema may be accompanied by constitutional manifestations, such as anorexia, fatigue, nausea and vomiting, diarrhea, and irritability. The increased susceptibility to bacterial infection regularly seen in the childhood disorder is rare in adults. A prognosis is difficult on clinical grounds. Although persistent high blood pressure and uremia portend a gloomy outlook, complete healing occurs in some cases in which these findings are present. Recovery has been reported after active disease has lasted

for 156 months, and patients with persistent proteinuria have been followed for 30 years after the onset.

More important than statistical data is the ability to make a prognosis in any individual case. Most helpful in this regard are: (1) serial tests of renal function (urea clearance, serum creatinine level) and (2) renal biopsy. If the urea clearance is markedly reduced or if the concentration of serum creatinine is elevated over a long period of time, it can be said that recovery cannot be expected. Individual prognosis may also be predicted on the extent and severity of glomerular involvement on renal biopsy. In cases in which there is extensive glomerular hyalinization, regardless of cause, the disease will generally run a down-hill course. As more is learned about the distinguishing features of the various forms of the nephrotic syndrome, predictability will be improved. Lupus nephritis, for example, progresses more rapidly and inexorably than glomerulonephritis. Nephrosis caused by diabetic nephropathy and amyloidosis may be resistant to all forms of therapy.

Some general principles of therapy can be advocated with individual variations depending on the clinical situation and the ingenuity of the physician.

It must always be remembered that the nephrotic syndrome is generally a chronic and discouraging disorder for the patient. Flexibility rather than rigidity is the rule. Brief lapses from sodium restriction should be allowed on special occasions, such as holidays and birthdays. At times, great ingenuity is required in devising a diet which will insure adequate nutrition and still prove palatable. With a mixed nephrotic syndrome and terminal uremia, it is often kinder to permit the patient to spend his last remaining days at home and to partially control his edema with salt restriction or diuretics, rather than to hospitalize him for steroid therapy. He should be encouraged and made to feel that by keeping careful weight records or by testing his urine for protein he is an essential part of the therapeutic team. Adverse effects of treatment, such as acne, should be explained in advance. With an honest but truly optimistic attitude on the part of the physician, the handling of these patients is usually gratifying. (Maxwell, M.H., *The Nephrotic Syndrome in Adults: Postgrad. Med.*, 23: 427-435, April 1958)

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Systemic Lupus Erythematosus

Systemic (disseminated) lupus erythematosus has been known for at least 50 years, but its exact nature and the pathogenetic mechanisms bringing it about are almost as obscure now as they were when the disease was first described. Considered a rarity for the first three decades of the present

century, its incidence seems to be increasing steadily, although whether this is actually so or the result of better recognition is difficult to state.

Systemic lupus must still be classed as a complex disorder of obscure origin. Even its histopathology has been in doubt, often in the hands of the same observers.

In the present article, a number of cases of S. L. E. are presented that emphasize the occurrence of various hematologic abnormalities of an "auto-immune" type. The L. E. factor is discussed as one of the immunologic abnormalities of the disease. Finally, a consideration of systemic lupus as a complex of auto-immune abnormalities involving various constituents of the blood and endothelial surfaces is presented, together with some speculations as to possible mechanisms which might initiate or enhance the immunologic process.

Systemic lupus must surely be considered a protean disorder. Originally, it seemed to be primarily and fundamentally a dermatologic disease. Emphasis on the hematologic abnormalities of lupus was somewhat slower in development. Gradually, however, it became apparent that leukopenia, thrombocytopenic purpura, a positive Coombs' test with auto-immune hemolytic anemia, combined hemolytic anemia with thrombocytopenia, a false-positive serologic test for syphilis, and even a hemorrhagic disorder due to "anticoagulants" were frequently associated with the disease. These conditions were almost always interpreted as secondary or "symptomatic" manifestations or complications of the disease rather than as integral features, like the dermatologic lesions or the histologic abnormalities. With the discovery of the "L. E. cell," first in bone marrow and later in the blood, and eventually the demonstration that the serum of patients with S. L. E. contained a factor which acted upon leukocytes in such a manner as to induce nuclear phagocytosis, a shift in emphasis from the histologic to the more dynamic serologic approach may be said to have begun. This has eventually led to the thesis developed in the present discussion, namely, that systemic lupus—its clinical, hematologic, and histologic features—is the end result of a series of reactions, probably immunologic, directed against various endothelial and hematologic constituents.

An analysis of the various abnormalities found in the cases presented leads to the following conclusions: (1) That there is great variation in the degree and number of possible abnormalities from case to case and from time to time in the same case; (2) That there are fundamentally two sets of abnormalities: (a) those relating to the small blood vessels or endothelial surface vasculitis, and (b) those relating to various constituents of the blood.

The hematologic abnormalities of systemic lupus include a positive Coombs' test, with or without hemolytic anemia; thrombocytopenic purpura; leukopenia, at times severe; a positive serologic test for syphilis; a hemorrhagic disorder due to circulating anticoagulants, and the L. E. factor.

They may be said to be just as representative of the disease as are the "onion-skin" vascular lesions in the spleen, the "wire-loop" lesions in the kidneys, or the vascular and "collagen" lesions elsewhere. The various hematologic abnormalities, including the L. E. factor, may be considered as "auto-immune" in nature with the development of auto-antibodies against various antigens in the blood cells or plasma. The L. E. factor is probably an abnormal auto-antibody directed against a constituent of the leukocyte nucleus. Other leukocytic antibodies may also occur in the disease.

If the various hematologic lesions of systemic lupus are considered to be "auto-immune," it is likewise possible that the vascular lesions (vasculitis) with resultant skin lesions (lupus), arthritis, nephritis, pleuritis, endocarditis, et cetera, may also be due to auto-antibodies, but in this instance, directed against small blood vessels. Indeed, the entire disease of systemic lupus may be a complex of immunologic disturbances affecting (1) blood cells and other blood constituents, and (2) small blood vessels. The L. E. factor may be considered as only one of the immunologic abnormalities of lupus; thus, its lack in a given case does not necessarily rule out the presence of the disease.

"Idiopathic" thrombocytopenic purpura (ITP) is often a prodrome of systemic lupus—thus, every case of ITP in a young woman should be suspected of being lupus. "ITP" need not be considered to be symptomatic of lupus, but simply as one part of the generalized disease. Combinations of ITP with auto-immune hemolytic anemia are even more likely to be examples of lupus, whether or not other manifestations of systemic lupus are present. Dissemination of the lupus process may be accelerated by splenectomy.

The presence of complex mixtures of auto-antibodies in systemic lupus suggests that numerous antigens (perhaps altered blood cells, altered blood plasma constituents, altered small blood vessels) are concerned. Because the great majority of cases of the disease occur in women, the possibility is present that antigen development may take place in the menstruating endometrium. Here at monthly intervals alterations in blood cells, blood plasma constituents and small blood vessels (spiral arteries) take place. One may speculate that in certain women these altered cells, plasma factors, and blood vessel constituents become auto-antigenic, thus leading to the formation of several types of auto-antibodies against both blood constituents and small blood vessels and, thus, to the complex disease known as systemic lupus. The periodic character of the menstrual cycle might well aid in auto-antibody formation. Such a speculation does not preclude the possibility of auto-immunization by other mechanisms as in the relatively uncommon cases in males. (Dameshek, W., Systemic Lupus Erythematosus: A Complex Auto-Immune Disorder? *Ann. Int. Med.*, 48: 707-727, April 1958)

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Peripheral Arterial Occlusive Disease

Confusion and disagreement concerning the choice of therapy for patients with acute peripheral arterial occlusion are readily understandable. Many patients compensate so effectively for an acute obstruction that they do not seek medical attention. Among patients who do consult physicians, the majority recover without specific therapy. Many factors other than the specific therapy employed influence the ultimate result. Acute myocardial infarction, pulmonary embolism, congestive heart failure, renal insufficiency, or a cerebral vascular accident may complicate the clinical picture and cause a fatal outcome. Many patients have old peripheral arterial occlusive disease that limits the efficacy of collateral circulation. The therapeutic problem is often increased because some patients have associated conditions that preclude anticoagulant therapy, such as the bleeding peptic ulcer, or shock, which favor the propagation of intravascular clot. Evaluation of the net physiologic gain from induced alterations in autonomic tone remains obscure. Whether the direct surgical relief of acute arterial obstruction is preferable to anticoagulant therapy has not been established. In addition, the use of lytic agents in the dissolution of arterial thrombi is still in the stage of experiment. Finally, generalizations from one hospital experience to another are inherently limited by the variations in the type of patient admitted to each institution. For these many reasons, there has been as yet no agreement as to an optimal plan of therapy.

With these reservations clearly in mind, the authors reviewed data on the pathogenesis and course of acute arterial occlusion obtained from five sources: (1) the immediate and long-term outcome of patients with acute arterial occlusion of the lower extremity who were admitted to the Beth Israel Hospital in Boston during a six-and one-half year period; (2) the pathological examination of all limbs amputated at the hospital during this period by a special injection and dissection technique; (3) femoral arteriograms performed on cadavers; (4) necropsy material on patients with acute arterial occlusion; and (5) data from an experimental investigation of acute arterial occlusion in dogs. Therapeutic implications derived from data are discussed.

Traditionally, acute arterial occlusions are classified according to whether the obstruction is caused by an embolus or thrombus. Although, in many instances, it was clear that the obstruction was embolic in origin, it was not possible to make this decision with any assurance in several patients in this study. Therefore, the authors have distinguished neither the etiology nor the source of each acute obstruction, but have classified all such episodes as "acute arterial occlusions."

During the period of this investigation, 75 patients were hospitalized in whom a diagnosis of acute arterial occlusion of a lower limb could be made. This material was obtained from an examination of the records of 437 patients discharged with diagnoses indicative of peripheral arterial occlusive disease.

There is ready agreement that in the treatment of acute peripheral arterial occlusion all systemic factors that increase the disparity between local blood supply and demand should be corrected. Thus, anemia, heart failure, shock, electrolyte imbalance, and infection should be promptly treated and thermal, chemical, and mechanical trauma should be avoided. In the selection of more specific therapy, agreement is not so universal. However, among the patients with acute arterial occlusion, it was clear that the threat to life was at least as great as the threat to limb. Thus, any diagnostic or therapeutic procedure that was designed to save a limb, but that increased the risk to life, was not justified. This was particularly true during the first 24 hours of symptoms when 31% of deaths occurred. When these observations are considered in relation to the data presented on the pathology of acute arterial occlusion and on the nature of the compensatory responses to arterial obstruction, the potential value of embolectomy, autonomic blockade, and anticoagulant and fibrinolytic agents can be critically reviewed.

The pathogenesis and course of acute peripheral arterial occlusion outlined in this study provide a basis for the evaluation of procedures recommended for the prophylaxis and treatment of acute ischemia.

Acute occlusion of a leg artery usually reflects but one episode punctuating a progressive or recurrent process having its origin in the heart. It represents, in essence, a medical emergency in which the threat to life is at least as great as the threat to limb. Thus, any diagnostic or therapeutic procedure that is designed to save a limb, but that increases the risk to life is not justified. This is particularly true during the first 24 hours of symptoms.

Neither is it feasible nor necessary to distinguish between acute arterial embolism and thrombosis. Many acute occlusions, although not recognized clinically because of their small size, may, nevertheless, contribute to ischemia by their strategic location or by serving as a nidus for the propagation of clot.

Embolectomy, when considered in relation to the total clinical problem, is not recommended as the treatment of choice in the acute phase of the occlusive process, although its efficacy in individual cases is well documented. In contrast, the evidence is entirely inadequate to justify medical or surgical alterations in autonomic tone in the treatment of any phase of organic arterial obstruction.

Fibrinolytic agents may in time have a place in the early treatment of acute arterial occlusion and bypass grafting may be of value in the management of residual ischemia. The role of drugs in preserving or producing a normal sinus rhythm and of remedial cardiac surgery in diminishing the recurrence of systemic arterial emboli remains to be evaluated.

Anticoagulant therapy—although not ideal—appears to offer promise of the greatest over all benefit with the least risk. This is particularly true

for the prevention of recurrent thromboembolic episodes in the leg or elsewhere in the circulation. (Wessler, S., et al., Studies in Peripheral Arterial Occlusive Disease - III. Acute Arterial Occlusion: Circulation, XVII: 512-523, April 1958)

* * * * *

Recurrent Dislocation of the Patella

The pathomechanics of recurrent dislocation of the patella has been fully described in the literature. The laxity of the medial capsule, the valgus knee, the flat articular femoral condyle, abnormalities of the position, shape, and size of the patella, and the occasional shifting in the insertion of the patellar tendon have all had procedures designed to correct or remedy the deformity. The majority of these operations have rectified the dislocation of the patella, but have failed to attack the intra-articular problems which the authors believe occur as residual changes following the original deformity. There also has been a noticeable failure to differentiate between the pathological changes seen in childhood and those seen in later life. This discussion, with one exception, is concerned only with those cases in which the recurrent or chronic dislocation is present in the adult.

Recurrent dislocation of the patella in the adult generally presents severe degenerative changes in the articular cartilage of the patella, and not infrequently presents so called mirror-image changes in the lateral condyle of the femur and chondromalacia. When dislocation of the patella was corrected by any of the described operations, such as capsuloplasty, fascial transplants, transplantations of the patellar tendon, or osteotomy, a high percentage of late poor results was encountered because mechanical arthritis of the patello-femoral joint developed after a number of years. These changes came from chondromalacia and distortion of the patella. On being restored to the intercondylar groove, the friction of incongruous surfaces produced irritation.

Patellectomy without quadricepsplasty is an illogical procedure because abnormal mechanics persist and recurrent dislocation of the tendon may result. The authors are unable to give either the exact age at which irreparable changes may develop in the patella or how long subluxation must be present before chondromalacia develops. In a series of 20 patients (24 operations), all but one showed advanced degenerative changes of the articular cartilage.

Recurrent dislocation of the patella results from congenital, developmental, or traumatic factors or from a combination of these. In the present series, 17 knees had symptoms considered to be congenital, 6 were traumatic and 1 was unknown. Surgical findings showed four instances of mirror-image changes in the femoral condyle and five instances of loose bodies.

Dislocation may be present in childhood or may manifest itself clinically in adult life. The patella may merely subluxate or may present chronic lateral displacement.

In an effort to correct the anatomical deformities and at the same time to eliminate the hazards of patellofemoral arthritis, a new operative procedure was devised by the authors which has been used on 20 patients with a total of 24 operations.

The patients ranged in age from 11 to 62 years with symptoms present from 4 to 40 years; there were 12 females and 8 males. Bilateral operations were performed in 4; although the disease was bilateral in several others, the symptoms did not warrant surgical repair.

In this series of 20 patients, all have resumed their normal activities. Of the 22 patellectomies with quadricepsplasty, results were excellent in 15, good in 6, and poor in 1. By an excellent result is meant full painless motion, resumption of normal activities, and good quadriceps power. Two of the patients with excellent results had some loss of flexion. In a good result, there is normal painless motion and the patient has resumed normal activities, but there may be some residual weakness in the quadriceps power. This power may yet be improved with further supervised resistive exercises.

There was only one patient in whom the result was less than good. In this patient, extension is possible to within 10 degrees of full extension and there is a loss of 10 degrees of flexion. There is weakness in the quadriceps and mild subjective pain. One boy, 2 years after this procedure, played baseball at college; another young man who had a bilateral procedure was able to dive from a springboard and engage in water skiing.

Three patients have mild residual restriction in flexion. However, each of them had other defects prior to surgery and the end results in 2 of these patients are considered to be excellent. The third is classified as poor.

Selection of the operation for correction of recurrent dislocation of the patella should depend upon the patient's age. In the adult, the pathological changes in the patellofemoral joint lead to mechanical arthritis unless patellectomy is performed. The authors' procedure corrects the intra-articular defects. The patients in this series have been followed for a period of one and one-half years to twelve years without evidence of recurrence or deterioration of the quadricepsplasty. The excellent function gained suggests that this procedure should have preference in the correction of recurrent dislocation of the patella in adults. (West, F. E., Soto-Hall, R., Recurrent Dislocation of the Patella in the Adult: J. Bone & Joint Surg., 40-A: 386-393, April 1958)

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Morbidity Indices

Certain indices are useful in analyzing the accomplishments of the Navy Medical Department and in describing the health of naval personnel. A review of some of these factors for calendar year 1957 includes admissions to the sicklist, disease and injury incidence, certain measures of Medical Department workload, dental care, and permanent manpower loss. These data are of a provisional nature and some are subject to slight change when a longer timelag permits final summarization.

During 1957, the Medical Department was called upon to meet the serious threat of an influenza epidemic. As a result of the increased influenza incidence, the admission rate increased for the first time in several years. Permanent manpower loss through death and invaliding from service continued to decline.

The most dramatic experience of the Navy Medical Department during calendar year 1957 was the worldwide outbreak of influenza—the most extensive to strike naval personnel in recent years. As a result of the higher than usual incidence of acute respiratory infections, the morbidity incidence rate increased substantially. The 1957 incidence rate, 444 per 1000 average strength, is an increase of approximately 23% over the 1956 rate. When acute respiratory infections are excluded from the disease and injury incidence rates for 1956 and 1957, the latter year has the lower rate.

The 1957 all-causes incidence rate represents approximately 378,000 new cases of disease and injury taken up on the sicklist. About 15% of these, principally venereal disease and nongonococcic-urethritis cases, actually involved no sick days, but were treated on an outpatient basis and carded for record purposes only.

Morbidity incidence rates for all causes were higher than in 1956 in all general areas—the greatest increase occurring among ships' personnel.

The incidence rate of acute respiratory infections was almost three times the 1956 calendar-year rate. Cases diagnosed as Asian-type influenza, many of which had laboratory confirmation, accounted for 57% of the 1957 acute respiratory disease incidence. In general, the monthly incidence rates of acute respiratory diseases were relatively low during the early months of 1957.

In May, a sudden and sharp rise in the acute respiratory disease incidence rate occurred in the Pacific area, most notably among ships' personnel, but also among personnel ashore. This increase reflects the outbreaks of Asian-type influenza which started aboard ships having contacted far eastern ports and which spread rapidly through Formosa, the Philippines, Japan, Okinawa, Hawaii, and other areas experiencing epidemics among their civilian population.

The peak monthly rates of the major geographical areas are of interest. The peaks occurred at different times and were of different magnitudes. The

peak rate occurred in June for shore-based activities of the Pacific, in July for the Pacific Fleet and MSTs vessels, and in October, for the continental United States, ships, and shore facilities of the Atlantic area. August and September were lull periods in all areas except the Atlantic. Peaks were highest for personnel of the Atlantic Fleet and of the Military Sea Transportation Service.

The total number of naval personnel admitted to the sicklist with a diagnosis of influenza during 1957 was approximately 67,000. Well over 34,000 of these were in continental United States, 26,000 were aboard ships, and almost 7000 were in noncontinental activities—5000 in the Pacific area and under 2000 in the Atlantic area. In addition, dispatches indicate that thousands of cases navywide were treated on an outpatient basis.

Pneumonia incidence occurred at a slightly higher rate than in 1956. Accidents, violence, and poisonings were reported at the same rate as in 1956 (47 per 1000 average strength). Incidence due to motor-vehicle accidents (accounting for about one-fifth of the accidents), violence, and poisonings, declined slightly. Venereal disease incidence rates, comprised mostly of outpatient cases, declined slightly in all areas except the Atlantic Fleet.

For the third consecutive year, a marked reduction was made in poliomyelitis incidence. Provisional data show 22 new cases reported during the year—about one-third as many as occurred in 1956. The peak monthly rate of 1957 (0.1 per 1000 average strength) occurred in April when 4 cases were reported.

An increase in malaria incidence among naval personnel in Okinawa and Japan pushed the 1957 incidence ahead of 1956. However, this increase was not sufficient to change the rate of 0.1 per 1000 average strength. Of the 102 cases (provisional data) reported during the year, 28 were in Okinawa and 21 in Japan. Other concentrations were noted in the Canal Zone (12 cases), Republic of the Philippines (6 cases), Hawaii (4 cases), and Morocco (3 cases).

The calendar year 1957 incidence rate for disease and injury among recruit personnel was over 3 times the rate for seasoned personnel. Non-recruit personnel had a 20% increase over 1956 in over all incidence rates, while recruits had a 60% increase.

Much of this difference between recruit and nonrecruit incidence rates was due to the fact that recruit personnel had higher rates for the communicable diseases, in main, rubella and acute respiratory infections. Both the recruit and nonrecruit rate for the latter category were greatly affected in calendar year 1957 by the influenza outbreaks. Recruits also have higher rates for accidents, violence, and poisonings.

Naval industrial establishments with more than 300 civil-service employees reported approximately 450,000 new cases of disease and injury treated on the job during calendar year 1957. Over 360,000 of these were nonoccupational conditions. The remaining cases of occupational origin were comprised mainly of injuries. Approximately 1900 were medical conditions.

Occupational medical conditions were caused chiefly by physical agents; actinic rays alone accounted for nearly one-fifth of the total. Skin irritants ranked second with solvents, oils, and greases large contributors.

The statistical data relating to the dental care performed during 1957 demonstrate the Navy Dental Corps' part in the maintenance of the physical fitness of Navy and Marine Corps personnel. The over all picture of the dental workload for 1957, when compared with that of 1956, shows about a 2% increase in total dental procedures and a 5% decrease in the number of patients treated. Reduction in total naval strength and in the number of recruits coming into the service during 1957 accounts for the decline in the number of active-duty Navy and Marine Corps patients treated.

There was a noteworthy decrease (15%) in oral surgery since 1956. This parallels the drop in the number of incoming recruits during the year and is not surprising because approximately one-third of the oral surgery was performed for recruits. The 9 and 12% increases in operative dentistry and periodontics, respectively, substantiate the fact that the Navy Dental Service places emphasis upon the prevention of dental caries and restoration of teeth. Prosthodontics was up 4%.

Although dental care for dependents contributed less than 4% of the total workload, it is interesting to note the effect of the new Medicare Act. The year 1957 is the first full calendar year the Dependents' Medical Care Act, effective 7 December 1956, has been in force. Comparing the dental care of dependents in 1957 with that in 1956, the number of patients treated and the number of total dental procedures more than doubled. In 1957, there were more dental procedures performed in each of 4 major categories ranging from an 89% augmentation in oral surgery to a 500% increase in prosthodontics. Approximately 95% of this dependent care was provided in noncontinental areas where all types of routine dental care is provided to eligible dependents (within the availability and capability of the dental staff).

A large proportion of the dental care provided for dependents was of an urgent nature. Of special interest is the fact that oral surgery, mainly extractions, accounted for 15% of the major types of dental care performed for dependents as compared with only 9% of those performed for all other dental patients combined.

The medical attrition rate for Navy and Marine Corps personnel declined in 1957. The decreases for the 3 component types of permanent manpower loss—medical-survey discharges, physical evaluation separations, and deaths—ranged from 5 to 8%. During this same period, the average strength of the Navy and Marine Corps changed very little. (0.4% decrease).

According to provisional data for calendar year 1957, slightly less than 12,000 naval personnel were lost through medical attrition. This is in contrast with 12,860 in 1956.

There were fewer deaths among Navy and Marine Corps personnel in 1957 than in 1956. The provisional mortality rate dropped to 179 per 100,000

average strength—5% lower than in 1956 (188 per 100,000). A total of 1574 active-duty naval personnel died in 1957—86 fewer than in 1956.

(Statistics of Navy Med., BuMed, April 1958)

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Notes on the 1958 Industrial Health Conference

The 1958 Industrial Health Conference convened April 19-25, 1958 in Atlantic City, N. J. These annual conferences are considered to be among the country's leading meetings on industrial health education. In addition to knowledge gained from the professional papers presented and discussions conducted, they offer to Naval occupational health personnel opportunities for personal consultations with fellow military and civilian colleagues on newest developments in occupational health and on problems of special interest to the Navy. Information thus obtained may be used to augment the Navy's Occupational Health Program, in addition to other benefits, and aids greater utilization of Naval manpower both military and civilian.

Doctor D. B. Allman, President, American Medical Association, addressed members of the Industrial Medical Association. An address, Man's Relationship to Man, was delivered by Major General J. P. Cooney (MC) USA to members of the American Industrial Hygiene Association.

A meeting of Naval occupational health personnel attending the Conference was held on 23 April with over 60 persons present. This group consisted of medical officers and industrial hygiene engineers from Naval activities in the United States and Oahu, T. H. Captain L. B. Shone MC USN, Director, Occupational Medicine and Dispensary Division, Bureau of Medicine and Surgery, opened the meeting by introducing Dr. Edward Holmblad, Managing Director, Industrial Medical Association. Doctor Holmblad spoke briefly on the importance of the Occupational Health Conferences and the benefits to be derived from them. Admiral I. L. V. Norman MC USN, Inspector General, Medical, Bureau of Medicine and Surgery, was called on next. Admiral Norman extended the Surgeon General's greetings to the Navy group and stressed the importance of keeping abreast of the newer developments in occupational health in order to effectively combat new health hazards resulting from rapid technological advances.

Professor Philip Drinker, Harvard School of Public Health and Consultant in Industrial Hygiene to the Surgeon General of the Navy, gave a short talk on training in industrial hygiene. Commander V. Jones NC USN, Bureau of Medicine and Surgery, represented the Navy Nurse Corps and expressed the desire to assist in every manner possible to make the Navy Occupational Health Program an outstanding one. Captain Harry Alvis MC USN, Director, Submarine Division, Bureau of Medicine and Surgery and the Bureau Liaison Officer to the Bureau of Ships, gave a short address on the relationship of submarine medicine to occupational medicine.

The meeting was turned over to Commander J. Siegel MSC USN, Head, Occupational Health Engineering Branch and Toxicology Section, Bureau of Medicine and Surgery. He introduced Mr. L. Hellman, Statistics Division, Bureau of Medicine and Surgery, who reviewed items on the Occupational Health Data Sheet, NavMed 576, and the BuMed Instruction promulgating instructions for its preparation and submission. Mr. Hellman endeavored to clarify occupational health reporting to overcome many of the errors and omissions on these quarterly reports received from most of the Navy's industrial type activities. Doctor Harry Hays, Director, Toxicological Information Center, National Research Council, National Academy of Sciences, reviewed the history and functions of the Toxicological Information Center and described some of the problems which had been presented to the Center by the Armed Forces.

Mr. M. Alpert, Division of Chemistry, Bureau of Ships, reviewed the toxicology and chemistry of epoxy-resins and hydraulic fluids. Mr. C. Bergholdt, Industrial Hygienist, Naval Gun Factory, spoke briefly on the current status of industrial hygienists with respect to higher ratings, and the progress to date on their being placed on the critical category list.

Commander Siegel turned the meeting back to Captain Shone, the final speaker on the program, who covered the following subjects in his address: Problems arising from annual chest x-rays; The Navy Hearing Conservation Program; Voluntary health programs, such as immunizations against Asian influenza, poliomyelitis, and tetanus; Surveys in Naval industrial activities for diabetes, overweight, heart disease, and cancer; Definitions of physical impairment and disability; Preplacement and periodic physical examinations for those employed in hazardous occupations; Disaster control plans with special reference to care of large numbers of personnel, giving emphasis to injuries caused by blast, radiation, and heat; Sight conservation programs; Necessity for strict observance of firefighters passing their periodic physical examinations for fitness as firefighters.

In conclusion, Captain V. G. Backman MC USN was praised for his fine work in Occupational Health at the Portsmouth Naval Shipyard, N. H. Captain Backman retires from the Navy this year. (OccMedDispDiv, BuMed)

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Carbon Dioxide Absorbing Agents

Your attention is invited to the presence of two standardized preparations in the Armed Services Medical Stock List. Soda lime USP #6505-153-8518 has been available for years. However, a newer compound, Baralyme #6505-299-8205, which consists of 20% barium hydroxide and 80% calcium hydroxide, is now available. This product is considered by many to be more stable in its moisture content because it has eight waters of crystallization combined in the chemical composition ($\text{Ba}(\text{OH})_2 \cdot 8\text{H}_2\text{O}$). This remains

unchanged during moderate moisture content atmospheric changes, thus absorbing carbon dioxide efficiently at all times, and preventing "peaking." The advantages for use in B. M. R. and anesthetic machines are apparent and may be the preferred product. Attention is directed to A Clinical Study of Carbon Dioxide Absorption During Anesthesia: Reprint, Anesthesiology, Vol. 7, No. 4, July 1956, Major L.H. Mousel, Capt. W.A. Weiss, and Capt. L.A. Gilliom (MC) USA; and A Study of Carbon Dioxide Absorption: Thomas A. Edison Industries, Medical Gas Division. (ProfDiv, BuMed)

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FOOLS

The following classification of fools makes no pretext at being all inclusive. It does, however, provide a simple stratification that plainly reveals the relative degree of trouble preventive medicine officers experience from poorly informed doctors and others trained in the biologic sciences who should be their sheet anchor of support.

FOOLS

_____ FOOLS

_____ FOOLS who recommend the discontinuance of mass chest x-ray programs.

The first type of fool is a relatively harmless mutt who is so far behind the scientific procession that he does not concern himself with anything beyond the immediate complaints of his patients. This type is not a real problem because the informed public of this date educated by the slogan-headed campaigns for protecting one's health passes him by and seeks a more enlightened advisor.

The second type, the _____ fool is the one who is aware that the reason this country has a relatively low incidence of tuberculosis as compared with the rest of the world where this disease is a number one killer and crippler is that mass chest x-rays continually detect cases early, but who is frightened by mass hysteria into allowing some contacts to go unexamined. All contacts must be examined to control tuberculosis.

The last type of fool is really beyond the pale of scientific discussion. He is so absorbed in his specialty that he cannot see the woods for the trees. The chest x-ray is by far the most reliable diagnostic tool for chest diseases. To return to the physical examination only would be like returning to the Dark Ages. Skin tests show nothing about the activity of disease in the majority of cases. Most of the cities and industrial areas in this country are "high risk" areas for tuberculosis. If our health safeguards are let down, few will live long enough to be concerned about the color of eyes, number of toes, wheezes and sneezes several generations in the future.

It will be noticed that this discussion is limited to the control of tuberculosis. Lung cancer, a rather common disease whose victims can be cured only by early x-ray detection, is reason enough for mass chest x-rays. Heart diseases, fungus infections, and other serious diseases are found incidentally. It is really believed that stronger adjectives are needed to describe doctors and other scientists who dare question the necessity of a chest x-ray examination.

X-Ray examinations are not recommended without regard for the amount of radiation involved. This has always been a calculated risk. This already slight risk is being reduced today by careful, intelligent technicians and new equipment.

The modern health officer demands a thorough examination of everyone exposed to a serious disease by the best possible means in the hands of well trained personnel.

(Brig. Gen. L. A. Fox (MC) USA (Ret); LT J. F. Nowell MC USNR, TBC Section, PrevMedDiv, BuMed)

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Extensions of Duty

The following Medical officers at the U.S. Naval Hospital, Yokosuka, Japan, and the U.S. Naval Hospital Guam, Mariana Islands, have requested and been granted an extension of duty overseas for a period of one year:

YOKOSUKA

Captain Ira C. Nichols MC USN
Captain Arthur V. Miller, Jr., MC USN
Commander Richard Foulk MC USN
Lieutenant Commander Thomas W. Greenless MC USNR
Lieutenant Albert S. Goh MC USNR

GUAM

Captain Martin T. Macklin MC USN
Commander Donald W. Robinson MC USN

These extensions reduce the cost of travel for these officers and their dependents and for the travel involved in providing a relief. In addition, it provides the command concerned with more stable personnel and increases the efficiency of the Medical Department. (PersDiv, BuMed)

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IN MEMORIAM

CAPT Alexander N. Chaffin MC USN	23 April 1958
CAPT Harry L. Goff MC USN	19 April 1958
CAPT Isaac B. Polak MC USN (Ret)	15 April 1958
CAPT Chandler W. Smith MC USN (Ret)	9 April 1958
CDR William S. Burr HC USN (Ret)	20 April 1958
CDR Joash I. Yohannan MC USN (Ret)	2 March 1958
LCDR Samuel C. Marcus MSC USN (Ret)	30 March 1958
LCDR Lloyd C. Sims MSC USN (Ret)	25 February 1958
LT Joseph F. Kahn MSC USN (Ret)	6 May 1958
LT Glen F. Rickard MSC USN (Ret)	13 April 1958
LTJG Anna E. Gorham NC USN (Ret)	1 April 1958
LTJG Moon B. Mickler MSC USN (Ret)	23 March 1958
CHPHARM Lee R. Chase USN (Ret)	21 February 1958

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From the Note Book

1. Captain Ruth A. Houghton NC USN assumed the position of Director of the Navy Nurse Corps on May 1, 1958, succeeding Captain W. Leona Jackson NC USN who retired from active naval service that same day after a four-year term. (TIO, BuMed)
2. Captain L. J. Pope MC USN attended the Annual Meeting of the National Board of Medical Examiners held in Philadelphia, May 4, 1958. (TIO, BuMed)
3. Dr. Clay G. Huff, scientist on the staff of the Naval Medical Research Institute, NNMC, Bethesda Md., received the Department of Defense Distinguished Civilian Service Award from the Secretary of Defense, The Honorable Neil H. McElroy, on 9 April 1958. Dr. Huff received this Award for his outstanding contributions in the field of parasitology—especially malariology—during the past 30 years. He was recently honored by receiving the Navy's Distinguished Civilian Service Award for his efforts in research. (ONR)
4. The complications encountered in the treatment of 1000 burns are described. These resulted from both the thermal injury and the treatment of the burn. Present methods of treatment are described along with early follow-up. It is emphasized that there is no difference between the burn wound and any other wound; both must be kept as surgically clean as possible. (Ann. Surg., April 1958; LtCol. J. A. Moncrief (MC) USA)
5. This article traces briefly the development of the methods of preservation and storage of arterial homografts and describes the methods used in

the St. Louis City Hospital Artery Bank, especially with regard to newer techniques and concepts of high energy electron (cathode ray) sterilization. (Ann. Surg., April 1958; F. B. Hershey, M.D.)

6. Five hundred and forty-six cases of psoriasis were interviewed and their case histories analyzed. The response of 260 patients to treatment with tar baths and ultra-violet light was good. Over a third were completely cleared of lesions, but the duration of freedom was about 6 months in most cases and few were free for more than 5 years. The reports of those patients who had served in tropical and subtropical climates supported the view that deprivation of sunlight is a factor of major importance in psoriasis. (Brit. J. Dermat., April 1958; R. Church, M.D.)

7. Syphilis is now confined largely in the lowest socio-economic groups. Few physicians see many cases in their private offices. Yet over 200,000 newly reported cases were recorded in 1956 and the medical profession cannot ignore a disease with this prevalence. The essentials in the diagnosis, treatment, and epidemiology of syphilis are outlined in Ohio M. J., April 1958; E. W. Thomas, M.D.

8. A comparison is made of the first 5 years of the Toronto Maternal Mortality Committee with 8 other committees. Although methods and procedures vary, the results indicate that about 70% of maternal deaths are still preventable. Nearly two-thirds of the factors responsible for these deaths lie within the control of the physician. (Am. J. Obst. & Gynec., May 1958; D. Dalziel, M.D.)

9. Proper management of the more common cardiac arrhythmias requires accurate diagnosis based on the skillful use and interpretation of the history, physical findings, and electrocardiographic tracings. Appropriate drug therapy can then be instituted when needed. (Postgrad. Med., April 1958; W. R. Wilson, J. W. Culbertson)

10. In spite of the rather frequent finding of Meckel's diverticulum at autopsy and at operation, the preoperative roentgen diagnosis is rarely made. The authors believe that this diagnosis can be made more commonly if barium progress meal examinations of the small intestine are performed with care and the diagnostic possibility kept in mind. (Am. J. Roentgenol., May 1958; G. N. Stein, M.D. et al.)

11. Metastasis to the hand from a malignant tumor with its primary source elsewhere is recognized as an uncommon occurrence. This article summarizes the literature on the subject of metastatic tumors of the hand and adds 7 additional case reports. (J. Bone & Joint Surg., April 1958; R. Kerin, M.D.)

12. From observations of 33 patients with hypercholesterolemia, it appears conclusively established that in most instances large doses of nicotinic acid given orally for periods of 3 months to 1-1/2 years significantly decrease the concentration of plasma cholesterol, total lipids, and serum beta-lipoprotein cholesterol. (Circulation, Part I, April 1958; W.P. Achor, M.D. et al.)

13. A discussion of some liver function tests now in common use is presented with particular reference to the underlying mechanisms, methods of performance, interpretation, and sources of error. (Gastroenterology, April 1958; A.M. Snell, M.D.)

14. The use of intra-arterial nitrogen mustard in the treatment of pelvic cancer is described in Ann. Int. Med., April 1958; I.H. Krakoff, M.D., R.D. Sullivan, M.D.

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Recent Research Reports

Naval Dental Research Facility, NTC, Bainbridge, Md.

1. Electrophoresis of Saliva. NM 75 01 26.05.01, 30 December 1957.

Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Human Calorimetry by Means of the Gradient Principle. NM 01 03 00 .02.01, 20 October 1957.
2. Growth of Rickettsia Prowazeki in Irradiated Monolayer Cultures of Chick Embryo Entodermal Cells. NM 52 05 00.02.01, 5 November 1957.
3. Biosynthesis of Norepinephrine and Epinephrine by the Isolated Perfused Calf Adrenal. NM 62 02 00.03.01, 7 November 1957.
4. Enzymatic Variants of Influenza Virus. I. Isolation and Characterization of Slowly Reacting Enzymatic Variants of Influenza B Virus. NM 005 048.23 .05, 8 November 1957.
5. Effect of Rapid Rewarming and Time and Temperature of Exposure on Tissue Survival in Frozen Rabbits' Feet. NM 41 02 00.01.01, 8 November 1957.
6. The Nutrition of Shigella: Growth of Shigella Flexneri in a Simple Chemically Defined Medium. NM 52 04 00.02.02, 8 November 1957.
7. Experimental Shigella Flexneri Infections in Chick Embryos. NM 52 04 00 .01.01, 8 November 1957.
8. Effect of a Hyaluronidase-Antihyaluronidase System on the Absorption of Fluid from the Peritoneal Cavity of Rats. NM 01 02 00.03.01, 19 November '57.

9. A Field Evaluation of a System for Predicting Visual Range. NM 18 01 00 .02.01 and BuAer Project Order No. 71704-56, 20 November 1957.
10. Studies on the Alteration of Cocksackie Virus Infection in Adult Mice by Environmental Temperature. NM 005 048.23.06, 27 November 1957.
11. Cranial Reconstruction with Ethylenediamine Treated Bone. NM 71 01 00 .06.01, 10 December 1957.
12. On the Molecular Weight of Myosin. NM 01 01 00.02.02, 10 December '57
13. Behavior of Polyadenylic Acid at Acid pH's. NM 02 01 00.01.02, 12 December 1957.

Naval Medical Research Unit No. 3, Cairo, Egypt

1. Redescription of Ixodes Lunatus Neumann, 1907 and of a New Species Confused Therewith, from Madagascar. NM 52 08 03.11, December 1957.
2. The Elephant Louse Haematomuzus Elephantis Piaget, 1869 (Mallophaga, Haematomyzidae) on Wild African Elephants and Warthogs. NM 52 08 03.13, December 1957.

Naval Dental Research Facility, Great Lakes, Ill.

1. Chloride Levels in Parotid Secretion. NM 75 02 27, April 1958.

Naval Air Development Center, Johnsville, Pa.

1. Effect of Simulated Catapult Launching on Pilot Performance. NM 11 02 12.2, Report No. 1, 31 December 1957.

Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. Demonstration and Morphology of Pleuropneumonia-like Organisms in Clinical Material. NM 52 09 09.1.4, December 1957.
2. Quarterly Report of Miscellaneous Tests and Minor Investigations: October-November-December 1957.

Naval School of Aviation Medicine, NAS, Pensacola, Fla.

1. Electrocardiographic Standards for Healthy Persons 10 to 19 Years of Age: Heart Size in Adolescents. NM14 02 11 Subtask 13, Report No. 3, 20 November 1957.
2. Rating Scale Measure of Speech Disturbances that Accompany Delayed Speech Feedback. NM 18 02 99 Subtask 1. Report No. 71, 3 December 1957.
3. Effect of Pre-anesthetic Medication on Cardiovascular Force. NM 18 03 11 Subtask 6, Report No. 3, 20 December 1957.

(To be continued in an early issue)

DENTAL**SECTION**Rear Admiral Chandler Honored

Rear Admiral Alfred W. Chandler DC USN (Ret) was recently presented a scroll by the National Lafayette Baton Committee in recognition of his leadership in Naval dentistry at the National Naval Medical Center, Bethesda, Md. Formerly Chief of the Dental Division and Assistant for Dentistry to the Chief of the Bureau of Medicine and Surgery, Admiral Chandler joins a group of selected individuals whose names have been placed on the National Lafayette Honor List for their leadership in various fields of endeavor. This list honors the memory of the Marquis de Lafayette. Admiral Chandler is distinguished by being the first Naval officer and also the first dentist to be so honored.

During his 35 years of continuous active duty in the Navy Dental Corps, Admiral Chandler's interest was centered in the field of dental education where he worked to improve the training program for dental personnel.

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Board Certifications

Captain John P. Jarabak DC USN and Captain Jerome C. Stoopack DC USN were certified recently as Diplomates of the American Board of Oral Surgery. Captain Jarabak is on duty at the U. S. Naval Hospital, Camp Lejeune, N. C., and Captain Stoopack is on duty at the U. S. Naval Dental Clinic, Naval Base, Brooklyn, N. Y.

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Dental Graduates to Come on Active Duty

Two hundred and fifty-eight graduates of dental schools will come on active duty this summer as Dental officers in the U. S. Naval Reserve to start their period of obligated service. The majority will report during July 7 - 14, 1958. Every attempt is being made to have these orders delivered prior to the graduating dates of the new Dental officers.

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RESERVE SECTION

Modern Warfare and Civil Disaster Program Twelfth Naval District

The Commandant, Twelfth Naval District, will sponsor this symposium to convene at the U. S. Naval Radiological Defense Laboratory, San Francisco Naval Shipyard (Hunter's Point), San Francisco, Calif., on 19 and 20 June 1958. The program as planned will be similar to, but will not duplicate, the symposium conducted there on 17, 18, and 19 October 1957. Variations in subject matter reflecting recent advances and presented by speakers of outstanding prominence assure a program that will be interesting and informative to all Medical Department officers.

The Chief of Naval Personnel has authorized the awarding of retirement point credit for each day's attendance by all inactive Naval Reserve officers, provided they register with the authorized military representative present. Security clearance is not required.

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Summer Training in Ensign Medical Program

Beginning 1 July 1958, 215 undergraduate medical students holding commissions in the Navy's Ensign Medical Program and who are on vacation from medical school will commence a 60-day training period in Research Clerkships at twelve different Naval Medical Research Activities and Clinical Clerkships at fourteen Naval Teaching Hospitals located throughout the continental United States.

Research Clerkships, in addition to providing orientation and indoctrination in medical research, afford a detailed review of the specific research programs being conducted at the training activity. A part of the training will be spent in each Research Department and the trainee ultimately will serve as assistant in actual laboratory research on a specific current project.

The following Naval Medical Research Activities have been authorized to conduct this important training:

Naval Medical Research Laboratory
New London, Conn.

Air Crew Equipment Laboratory
Naval Air Material Center
Naval Base, Philadelphia, Pa.

Aviation Medical Acceleration
Laboratory
Naval Air Development Center
Johnsville, Pa.

U. S. Navy Experimental Diving
PRNC Unit
Naval Gun Factory
Washington 25, D. C.

U. S. Naval Medical Research
Institute
National Naval Medical Center
Bethesda, Md.

U. S. Naval Medical Field Research
Laboratory
Camp Lejeune, N. C.

U. S. Naval School of Aviation
Medicine
Naval Air Station
Pensacola, Fla.

U. S. Navy Mine Defense Labora-
tory
Panama City, Fla.

Naval Medical Research Unit
No. 4
Naval Training Center
Great Lakes, Ill.

Naval Medical Research Unit No. 1
Life Sciences Building
University of California
Berkeley 4, Calif.

Clinical Clerkship training available to the Ensign Medical officer who has completed at least his second year of medical school provides: indoctrination and orientation into Naval Medicine; rotation through the major professional services of the Naval Teaching Hospital and; performance of on-the-job training duties commensurate with the individual's professional attainments.

Clinical Clerkships have been established at the following Naval Teaching Hospitals:

Bethesda, Maryland

Bremerton, Washington

Charleston, South Carolina

Chelsea, Massachusetts

Great Lakes, Illinois

Jacksonville, Florida

Newport, Rhode Island

Oakland, California

Oceanside, California

Pensacola, Florida

Philadelphia, Pennsylvania

Portsmouth, Virginia

St. Albans, New York

San Diego, California

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PREVENTIVE MEDICINE SECTION

Cockroach Control in Naval Hospitals (The second of three installments)

3. General Procedures and Considerations

a. Cockroach control should be made an integral part of a hospital pest prevention and control program. This is important to the success of control efforts, whether the program is carried out by certified operational personnel or by contractors under certified Navy supervision. Specific pest control standards are covered in BuMedInst 6250.5. Well conceived, well implemented, and properly conducted pest prevention and control programs save maintenance funds.

b. If present high standards of hospital management are to be maintained by the Medical Department of the Navy, the over all absence or near absence of cockroaches in hospitals must be established as a goal. This can be accomplished only in the presence of strict, regimented, rigidly enforced general sanitation. Cockroaches, like all living organisms, must eat to live. Without a food source or supply they must perish or move on. Consequently, the first and foremost precept in sanitary control of cockroaches is to deprive them of food. This is not easy to accomplish, but experience proves that it can be done. Chemical control measures are meant first, last, and always to supplement sanitary control measures, not vice versa, as is often the erroneous opinion. At any rate, complete reliance on chemical control would be undesirable even if wholly effective because the conditions conducive to cockroach prevalence are also open invitations to many food-service practices and habits which are dangerous to, and wholly incompatible with, good public health standards. Absence of food spells absence of cockroaches. The absence of food is assured only by scrupulous attention to detail by food-service personnel in routine everyday cleanup after each meal in the messhall, galley, diet kitchen, ward, and snack bar. In addition, the overnight exposure of edible foodstuffs is to be avoided completely.

c. Cockroach elimination can be further simplified by regular detection and removal or minimization of all unnecessary cockroach hiding places. Although difficult to accomplish, when once completed, the preventive maintenance of cockroach-free premises is no problem. Particular attention

should be given to storage spaces and accumulations of refuse and dirt in, on, and under, or behind furnishings.

d. Periodic (usually weekly) sanitation inspections by the Sanitation Officer, the Environmental Sanitation Technician, or other qualified hospital personnel delegated this responsibility by the Commanding Officer assures compliance with established control requirements. A written report of inspection should be made to the Commanding or Executive Officer and the Pest Control Program operational personnel for information and guidance. If possible, a counter-inspection system is advisable whereby the certified pest control supervisor or operator inspects spaces periodically (at least bimonthly) for operational effectiveness. Copies of this inspection report should go to the Commanding or Executive Officer and the Sanitation Officer. This double check strengthens preventive control efforts and establishes the proper liaison between sanitation and pest control personnel for over all purposes.

e. The achievement of effective cockroach control requires the utilization of an experienced, trained, and certified pest control operator, using approved materials and equipment. Cockroaches are only one of the many economically important vectors and pests which considered as a whole constitute the justification for a concerted, organized pest prevention and control program. The cumulative losses, damage, spoilage, and detrimental effects on health and welfare caused by pests and vectors represent a significant liability for the average naval hospital or activity and justify the expenditure of funds for control. In its proper perspective, the organized, scheduled pest prevention and control program is not an optional luxury but an essential service without which an activity cannot function economically.

f. Supplementary chemical control measures are usually necessary if cockroaches are to be effectively held in check at, or below, a sanitary nuisance level, and are always necessary when an infestation has been established prior to effecting such a state of control. When chemical control measures are necessary and when adequate sanitation exists, cockroaches can usually be effectively controlled by the application of residual sprays and dusts, i. e., applications of relatively long-lasting insecticides to infested or traveled surfaces in such a way that the lasting effect is most pronounced. Sprays are more useful and generally preferred on exposed interior surfaces because of greater ease of application, neater appearance (not so unsightly as dusts), increased durability, more accurate and less hazardous application, more uniform coverage, and greater resistance to washing, cleaning, and weathering action. Dusts are often preferred for application to unexposed interior surfaces and enclosures, for unexposed exteriors, such as crawl spaces underneath buildings and porches, and for use where a fire hazard exists. The eggs are not directly destroyed by either sprays or dusts, but the newly hatched young are killed wherever residual protection remains.

g. Fumigation is never indicated exclusively for the control of cockroaches, because it is temporary, costly, and gives no residual protection. For the same reasons, the use of fogs, aerosols, and vapors is seldom indicated in hospital cockroach control operations.

h. If the over all absence or near absence of cockroaches is to be achieved, it is essential that both sanitary control measures and chemical control measures be established on a preventive basis rather than on a "trouble-call" type of operation. Scheduled preventive control implies thorough inspection every 6 to 8 weeks together with residual spraying, dusting, and space spraying as required and indicated by the inspection observations and reports. Cockroach control on a scheduled preventive basis is sound in practice as well as in theory. Control efforts on any other basis lead to dissatisfaction and an unacceptable level of infestation.

i. Thorough inspection is absolutely essential if adequate cockroach control is to be achieved. In many cases, hard-to-eliminate infestations are due to cockroaches coming from a hidden breeding source, such as within walls or double floors. During inspections, an aerosol bomb containing pyrethrin or allethrin should be used freely in spraying cracks and crevices to bring hidden cockroaches into the open. In addition, a portion of the inspections should be accomplished at night when cockroaches are normally active.

4. Materials

a. The following materials and equipment items are recommended for the average Naval hospital as the minimum requirements for proper and safe application of insecticides for chemical control of cockroaches. The quantity of each item to be kept on hand will vary with each institution depending on its size and general pest control program needs.

b. Application equipment.

- (1) Sprayer, Insecticide, Manually Carried
Air pump type, cylindrical, 2-gallon capacity
Stock No. GM3740-641-4719 Cost: \$55.00 each
- (2) Oiler, Hand, Forced-Feed
1-pint capacity (preferred)
Stock No. GF4930-268-9786 Cost: \$ 0.99 each
or
Oiler, Hand, Forced-Feed
1-quart capacity
Stock No. GM4930-275-7900 Cost: \$ 6.60 each
- (3) Syringe, Luer
20 cc. capacity (Use with No. 19 or No. 20 needle.)
Stock No. L6515-380-4300 (Armed Services Medical Stock List)
Cost: \$ 1.25 each (Syringe only)

- (4) Duster, Insecticide, Plunger Type
1- to 2-pound capacity
Stock No. GA3740-494-1767 Cost: \$ 1.65 each
- (5) Duster, Insecticide, Rotary Blower, Hand-Operated
5- to 10-pound capacity (For use under and around buildings)
Stock No. GA3740-494-1768 Cost: \$19.50 each
- (6) Paint Brush, 3-Inch, Nylon Bristle
GSA Stock No. GSA8020-597-4770
Cost: \$ 1.00 each

c. Protective (safety) equipment.

- (1) Gloves, Rubber, Solvent-Resistant
Stock No. DMB415-266-8686 Cost: \$ 0.79 pair
- (2) Coveralls, Safety, Industrial (Medium size)
Stock No. DF8415-254-2768 Cost: \$ 2.40 pair
- (3) Respirator, Air Filtering
Twin Cartridge Half Mask (For protection against organic vapors)
Stock No. GA4240-276-8935 Cost: \$ 5.90 each
- (4) Cartridge, Respirator, Air Filtering
Replacement Cartridges for Twin-Cartridge Half Mask
Stock No. GA4240-272-9958 Cost: Not given
- (5) Respirator, Air Filtering
Twin Filter Pad Half Mask (For protection against dusts)
Stock No. GF4240-276-8937 Cost: \$ 3.80 each
- (6) Filter, Respirator, Air Filtering
(As replacement pads for Filter-Pad Half Mask, for respiratory protection.)
Stock No. GA4240-272-9959 Cost: Not given
- (7) Goggles, Industrial, Rubber Frame
(Nonventilated type for protection against chemical splashes, mists, sprays, fogs, etc.)
Stock No. GM4240-203-0317 Cost: \$ 1.60 pair

d. Insecticides.

- (1) Insecticide, Dieldrin¹
Water-emulsifiable concentrate, 15.0 percent dieldrin
Stock No. GC6840-264-9043 Cost: \$ 5.00 gallon
or
Insecticide, Dieldrin
Liquid, oil solution, finished formulation - ready to use,
0.5 percent dieldrin

Stock No. Not yet assigned

Military Specification No. O-I-518, Type D

Cost: \$ 0.65 gallon

(2) Insecticide, Chlordane¹

Water-emulsifiable concentrate, 46.0 percent chlordane

Stock No. GC6840-270-8262 Cost: \$ 3.60 gallon

or

Insecticide, Chlordane

Liquid, oil solution, finished formulation - ready to use,
2.0 percent chlordane

Stock No. GF6840-252-0530 Cost: \$ 0.62 gallon

(3) Insecticide, Chlordane, Dust 5.0 percent²

Stock No. GM6840-543-7825

Military Specification No. MIL-I-21036

Cost: \$ 0.08 pound

(4) Insecticide, Diazinon²

Water-emulsifiable concentrate, 25.0 percent Diazinon

Stock No. Not yet assigned

Military Specification No. MIL-I-21146

Cost: \$14.50 gallon

or

Insecticide, Diazinon²

Liquid, oil solution, finished formulation - ready to use,
0.5 percent Diazinon

Stock No. Not yet assigned

Military Specification No. MIL-I-21177

Cost: \$ 1.50 gallon

(5) Insecticide, Aliphatic Thiocyanate-DDT

Liquid, oil solution of "Lethane" 1.0 percent or "Thanite"
1.5 percent and DDT 1.0 percent (Standard Navy Insecticide)

Stock No. GF6840-281-1990 Cost: \$ 0.62 gallon

(6) Insecticide, DDT-Pyrethrum

Nonrefillable, aerosol bomb, DDT 2.0 percent, pyrethrum-sesame
oil mixture 10.0 percent

Stock No. GF6840-664-0110 Cost: \$ 0.50 each

¹ Controlled-issue item. Procure in accordance with BUMEDINST 6250.4 and BUSANDA Manual, Vol. II, paragraph 22505.

² Nonstandard item. Procure in accordance with BUMEDINST 6250.4 and BUSANDA Manual, Vol. II, paragraph 22505.

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Shipboard Pest Control Training Course

The development of an adequate program for the accomplishment of effective pest control aboard Naval vessels is of continued concern to preventive medicine personnel of the Medical Department. During the past two years, surveys disclosed a principal problem area to be the lack of training and experience on the part of personnel assigned to pest control duties aboard Naval vessels. To correct this deficiency, a suitable short course in shipboard pest control was established at appropriate locations and was formally announced in the Medical News Letter, Vol. 30, No. 1, dated 5 July 1957.

According to a review of this training program from the date of its inception to 1 March 1958, 52 classes were held with a total attendance of 469 individuals representing virtually all types of fleet units. This is an impressive record when it is considered that some of the training activities have been scheduling this course for only a few months, in addition to the regular assignments.

Various problems were disclosed by the recent review. The lack of an appropriate training film was felt to be a severe handicap. In this connection, it can be reported that a training film specifically for this purpose is now in actual production. Where difficulty is encountered in getting personnel from the ship to the training activity due to the distance involved, efforts are being made to accomplish the training at major berthing areas and, in some cases even, aboard ships.

The attention of Medical Department personnel assigned aboard ship is again called to the availability of this training course with the recommendation that it be utilized as extensively as possible.

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Residual Chlorine in Water Distribution Systems Ashore

Since the early part of the twentieth century when chlorine came into use for disinfecting potable water, there has been discussion of the desirability of maintaining a residual in water distribution systems. The maintenance of residual chlorine as an "antibody" in the veins of a water system appears attractive because, under certain conditions, the residual provides some degree of protection against pathogenic organisms that might adventitiously enter the distribution pipes. During World War II, the practice of maintaining, or seeking to maintain, residual chlorine in water in distribution systems became fairly widespread, particularly in military establishments. Since the war there has been an increase in the number of towns and cities that maintain residuals in their water distribution systems.

Little uniformity of practice exists with regard to the type and amount of residuals maintained. In some systems, the residual sought has been free available chlorine and in others it has been combined available chlorine. In some places or at some times, the residuals are allowed to rise and fall through a wide range as the demand for water changes. Occasionally, operators attempt to maintain residuals in all parts of the system, but more often they are satisfied if residuals can be found in pipes through which water is actively circulating.

One fundamental fact is central to all others in this matter: The only stable chlorine residual is that developed in a chlorine-demand-free water; but the production of essentially chlorine-demand-free water has no public health justification. Virtual bacteriological sterility can be achieved by chlorination of otherwise potable waters with lower concentrations than required for the complete satisfaction of the demand-producing substances. Therefore, in ordinary practice all waters treated to meet drinking water standards contain minute concentrations of substances that react slowly with chlorine in dilute solution so that an initial chlorine residual tends to disappear as the water flows through the distribution system. Moreover, the inner surfaces of the distribution system itself will exert a chlorine demand which can initially be satisfied only by prolonged and relatively heavy chlorination. It follows, then, that in order to maintain a trace of residual chlorine in the water reaching the most distant consumer, the initial chlorine residual must be high enough to offset the demands of the water and, at the outset of the operations, to supply also the demand of the water-contact surfaces. To maintain a residual while avoiding high initial concentrations, rechlorination might be employed at the intervals throughout the system in a manner analogous to the use of pumping stations to offset friction losses in long pipelines.

Combined available chlorine residuals can be maintained within a distribution system much more easily than can free available chlorine residuals. The combined residuals, however, are relatively such weak disinfectants that it is questionable whether the two types of treatments should be considered analogous or comparable unless the combined residuals used are 10 to 20 times the usual values for free residuals.

The physical and technical difficulties of maintaining residual chlorine throughout a distribution system vary greatly with the physical layout of the system. What may be maintained with relative ease in a compact distribution system with good circulation may be difficult to attain in an attenuated system. These physical differences seem to preclude the enunciation of a single standard of practice.

Routine chlorine, in the concentrations customarily employed in water works' practice in permanent continental United States shore establishments, will not ordinarily disinfect any sizable amount of contaminating material entering the system, although this will depend on the amount of dilution which

occurs at the point of contamination, the type and concentration of residual chlorine, and the time-of-flow interval between the point of contamination and the nearest consumer. For this reason, a much higher than normal residual is indicated as an emergency procedure during periods when pressure in parts of the system may fall to a low or even negative value; e. g., periods of unusually heavy fire draft, broken mains, floods, or extensive reconstruction or rehabilitation. Such periods of need for the high residual chlorine are as a rule relatively short, ranging from a few hours to a few days.

That residual chlorine be used as a warning device has been suggested. The presence of a detectable chlorine residual throughout the system would signify that no entry of chlorine-consuming material had occurred. Conversely, a sharp drop in, or disappearance of, the chlorine residual would signal the immediate need for the institution of an emergency chlorination regime with a follow-up sanitary survey to locate the portal of entry of the contamination. The value of this scheme depends on the type of residual maintained and is directly proportional to the frequency of the sampling, the number of sampling points, and the extent of knowledge of the normal variations in residuals at the sampling points. A program involving the use of residual chlorine in amounts which, on disappearance, would serve as a warning of unusual contamination would entail considerable cost. In well designed distribution systems at permanent shore establishments covered by adequate plumbing codes and competent inspection, the danger of back siphonage and cross connection is minimal. Even where these conditions are not met, under ordinary circumstances, the use of residual chlorine as a warning device is not considered necessary nor very practicable.

In view of the foregoing factors, establishment of a universal standard with respect to maintaining chlorine residuals in water in distribution systems at permanent naval shore installations is not desirable. Because of wide variation of circumstances encountered in different types of permanent naval shore installations and activities, the best policy to follow is to decide what should be done only after all factors pertinent to a particular local situation or type of operation have been carefully reviewed.

Many water systems are able to continuously distribute safe potable water without maintaining residual chlorine in the system. In general, such systems are characterized by the excellence of their sanitary design, and by the thoroughness and competency of the sanitary control over their operation. Also, it is recognized that in other circumstances the most practical means of obtaining water quality may be insistence on sufficient chlorination to maintain a residual in water in the system. However, maintenance of a residual is not a satisfactory substitute for good design, construction, and supervision of a water distribution system at a permanent naval shore activity. The presence of a residual is not a guarantee of water potability. Routine bacteriological analysis at representative points throughout the distribution is the most significant measure of water safety.

TIPS TO VACATIONERS

BEFORE THE TAKE-OFF

Make sure your car is in A-1 condition. Check headlights, brakes, windshield wipers, engine, oil, steering and tires.

Be ready for emergencies. Make a check list of needed items such as: first aid kit, maps, keys, permits, identification, spare tire, flashlight, flares or fuses, wheel jack, lug wrench, clean cloths, paper and pencil. Also make sure your insurance and driver's license haven't expired.

Plan your trip well. Don't try to cover too much ground in a short time. Don't make a tight schedule. Allow for a good night's sleep each night. If possible drive only during daylight hours. About 300 miles a day is reasonable. Learn the laws of the states through which you will pass.

Load your car carefully. Pack as much as possible in the trunk. Be sure vision is not obstructed by baggage in rear. Pack a bag with items you will need during the day, another for night. Take along comfortable driving clothes.

ALONG THE WAY

Keep your mind on your driving. Don't do any sightseeing or map reading while driving. Pull off the road if necessary. Stop for coffee when drowsy.

Be prepared for changing traffic, weather, and road conditions—rush hours in cities, crowded rural highways, expressways, wet roads, hills, mountains and winding roads. Drive at a safe pace. Watch for posted limits and unusual traffic regulations.

Obey traffic signs and signals. Learn the shapes and colors of the Signs of Life. Octagon signs in red or yellow mean Stop! White rectangles give rules, speed limits, turning and passing rules. Yellow diamond shaped signs warn of dangerous or unusual conditions. Yellow triangular signs mean yield right-of-way. Round yellow signs and white crossbucks identify railroad crossings.

Keep your distance. Look out for pedestrians, children, cyclists, animals, slow-moving farm vehicles and slow-poke motorists.

(Traffic Safety, May 1958)

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